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Sertifikaat

REPUBLIEK VAN SUID-AFRIKA

PATENT KANTOOR
DEPARTEMENT VAN HANDEL
EN NYWERHEID



Certificate

REPUBLIC OF SOUTH AFRICA

PATENT OFFICE
DEPARTMENT OF TRADE AND
INDUSTRY

Hiermee word gesertifiseer dat
This is to certify that

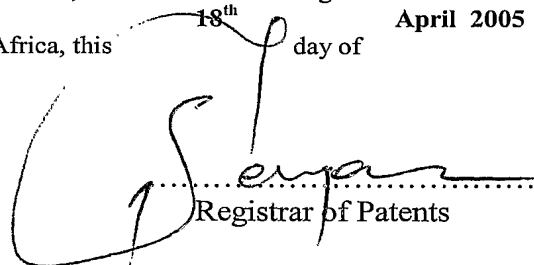
the documents annexed hereto are true copies of:

Application forms P.1 and P.2, provisional specification and drawings
of South African Patent Application No. 2004/0901 as originally filed
in the Republic of South Africa on 4 February 2004 in the name of
OLIVIER, Louis for an invention entitled: "VIBRATION GENERATOR
AND ASSEMBLIES EMBODYING SAME".

Geteken te
Signed at
PRETORIA

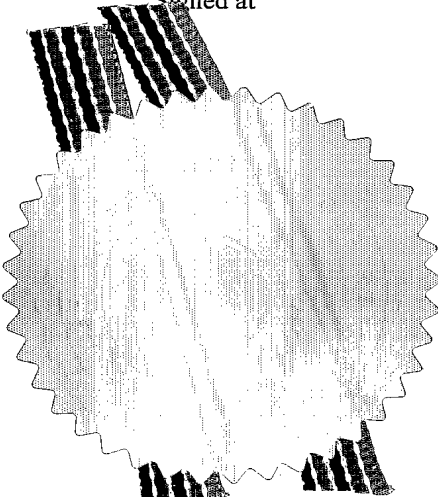
in die Republiek van Suid-Afrika, hierdie
in the Republic of South Africa, this

dag van
day of
18th April 2005


Registrar of Patents

**PRIORITY
DOCUMENT**

SUBMITTED OR TRANSMITTED IN
COMPLIANCE WITH RULE 17.1(a) OR (b)



FORM P1

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

APPLICATION FOR A PATENT AND ACKNOWLEDGEMENT OF RECEIPT

(Section 30(1) - Regulation 39)

The grant of a Patent is hereby requested by the undermentioned applicant(s)
on the present application filed in duplicate



REGISTRAR OF PATENTS, DESIGNS,
TRADE MARKS AND COPYRIGHT
JOHANNESBURG
Applicant's Reference: N65REG

21	01	Official Application No. 2004/0901	22	Lodging Date 2004-02-04	47	Applicant's Reference P0312
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71	Full name(s) of applicant(s) OLIVIER, Louis
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	Address(es) of applicant(s) 36 FABRIEK STREET, STRAND HALT, STRAND HELDERBERG, WESTERN CAPE PROVINCE, 7140 SOUTH AFRICA
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54	Title of invention VIBRATION GENERATOR AND ASSEMBLIES EMBODYING SAME
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The applicant claims priority as set out in the accompanying form P2	
The earliest priority is	
This application is for a Patent of Addition to Patent (Application) No.	
This application is a fresh application in terms of S 37 and based on Application No.	

21	01	
21	01	

This application is accompanied by:-

<input checked="" type="checkbox"/>	1a	A single copy of a provisional specification of	10	pages
<input type="checkbox"/>	1b	Two copies of a complete specification of		pages
<input type="checkbox"/>	2a	Informal drawings of	Nil	sheets
<input checked="" type="checkbox"/>	2b	Formal drawings of	2	sheets
<input type="checkbox"/>	3	Publication particulars and abstract (form P8 in duplicate)		
<input type="checkbox"/>	4	A copy of Figure of the drawings for the abstract		
<input type="checkbox"/>	5	Assignment of invention (from the inventor(s)) or other evidence of title		
<input type="checkbox"/>	6	Certified priority documents (documents)		
<input type="checkbox"/>	7	Translation of priority documents (documents)		
<input type="checkbox"/>	8	Assignment of priority rights		
<input type="checkbox"/>	9	A copy of form P2 and the specification of S.A. Patent Application No.		
<input checked="" type="checkbox"/>	10	A declaration and power of attorney on form P3		
<input type="checkbox"/>	11	Request for ante-dating on form P4		
<input type="checkbox"/>	12	Request for classification on form P9		
<input type="checkbox"/>	13a	Request for delay of acceptance on form P4		
<input type="checkbox"/>	13b			

21	01	
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74	Address for Service: Michael von Seidel, 10 Leccino Terrace, Bakkershoogte, Somerset West Western Cape Province, 7130 South Africa
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Date 2nd February 2004

for the applicant

The duplicate will be returned to the applicant's address for service
as proof of lodging but is not valid unless endorsed with official stamp

RECEIVED PATENTS DESIGNS,
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Official date stamp

2004-02-04

REGISTRAR OF PATENTS, DESIGNS,
TRADE MARKS AND COPYRIGHT
JOHANNESBURG

FORM P2

REPUBLIC OF SOUTH AFRICA
REGISTER OF PATENTS
PATENTS ACT, 1978

21	01	Official Application No. 2004/0901	22	Lodging Date : Provisional 2004-02-04		47	Acceptance Date
51	International Classification		23	Lodging Date : Complete			Granted Date
71	Full name(s) of Applicant(s)/Patentee(s) OLIVIER, Louis						
71	Applicants substituted:					Date registered	
71	Assignee(s)					Date registered	
72	Full name(s) of Inventor(s) OLIVIER, Louis						
Priority claimed		33	Country	31	Number	32	Date
54	Title of Invention VIBRATION GENERATOR AND ASSEMBLIES EMBODYING SAME						
Address of Applicant(s)/Patentee(s) 36 FABRIEK STREET, STRAND HALT, STRAND HELDERBERG, WESTERN CAPE PROVINCE, 7140 SOUTH AFRICA							
74	Address for service Michael von Seidel, 10 Leccino Terrace, Bakkershoogte, Somerset West Western Cape Province, 7130 South Africa						
61	Patent of Addition No.				Date of any change		
Fresh Application based on				Date of any change			

FORM P6

REPUBLIC OF SOUTH AFRICA

PATENTS ACT, 1978

PROVISIONAL SPECIFICATION

Section 30 (1) — Regulation 27

21

01

Official application No.

2004/0901

22

Lodging date

2004-02-04

71

Full name(s) of applicant(s)

OLIVIER, Louis

72

Full name(s) of inventor(s)

OLIVIER, Louis

54

Title of invention

VIBRATION GENERATOR AND ASSEMBLIES EMBODYING SAME

VIBRATION GENERATOR AND ASSEMBLIES EMBODYING SAME

5 FIELD OF THE INVENTION

This invention relates to a vibration generator and assemblies embodying same and, more particularly, to a vibration generator that is useful in application to the human body by generating vibrations that are transferred to
10 the body, typically by way of a cushion or mattress that made forms part of an article of furniture such as a chair or bed.

BACKGROUND TO THE INVENTION

15 It is well established that the application of vibrations of various different types to the human body, including activities often referred to as massage, has a highly beneficial effect that may vary according to how the vibrations are applied to the body, and is the vibration generator itself. The effect ranges from being substantially therapeutic to simply being relaxing with
20 numerous side benefits, not least of which is relieving stress. There has, accordingly, being appreciable activity in designing different apparatus that may vary according to the ultimate objective.

Thus, US patent 3,064,642, that dates back to 1957, proposes a dedicated
25 massage table that had numerous vibration generators built into its so that the different regions of a person's body could be treated with vibrations. This table is extremely expensive and is totally inappropriate to domestic use. US patent 3,311,935 describes a vibration generator as applied to a child's cot. Other apparatus based on vibration generators are used for a variety of the
30 purposes of this general nature some of which are described in US patents 3,678,923; 3,811,430; 4,559,929; 4,570,616; 5,188,096; 5,437,608;

5,730,707; 6,056,357; 6,505,361; and, as a rather special apparatus, 6,668,399.

There is, accordingly, a need for vibration generators that can provide
5 different and varied types of vibrations to suit different requirements and this
need has been addressed in US patents 4,570,616; 5,181,504; and
6,217,533, all of which strive to provide adjustable vibration generators that
can be used to create various vibratory motions.

10 As a general rule, all of the prior art vibration generators operate, as far as
applicant is aware, on a rotatable shaft or disc having an eccentric weight
that creates a vibration as shaft rotates. The vibration generators of the
latter type in which the vibrations are adjustable have included two different
motors, in all cases with generally horizontal axes of rotation, and in the latter
15 case (namely US patent 6,217,533) the axes of rotation being at generally
right angles to each other in a horizontal plane. The latter also provides
versatility in that it provides for two vibration generators that are
independently controlled by the single control unit and that can be positioned
at any required place, for example on a mattress, cushion or the like

20

OBJECT OF THE INVENTION

It is an object of this invention provide a vibration generator that provides a
somewhat different type of vibratory movement and that can, at least in
25 certain forms thereof, provide for considerable versatility and variation of the
format of the vibratory movement.

SUMMARY OF THE INVENTION

30 In accordance with one aspect of this invention there is provided a vibration
generator comprising a housing defining an a track for a freely movable
magnetic element therein, and a plurality of electric coils associated with the

track in a manner enabling sequential energisation of the coils to create movement of the magnetic element within the track in a manner imparting a vibratory movement to the vibration generator

- 5 Further features of the invention provide for the track to be an endless track, typically a circular but optionally an elliptical track in which case the coils are generally equally spaced around the periphery of the track; for the coils to be wound around the housing concentrically with the track therein at spaced positions along the length of the track; for the track to have a surface layer
10 operatively engaged by the magnetic element, said surface layer having desirable qualities including that of sound absorption; for the magnetic element to be spherical in shape in which case the track is preferably of generally circular shape in cross-section; and for the housing and coils to be encased within an outer shell that may be cast or moulded in situ to
15 permanently enclose the housing and coils.

Depending on the materials of manufacture it may be desirable to seal the housing in a closed condition following evacuation of air and optional purging with a suitable gas such as nitrogen or helium.

20

- In accordance with a second aspect of the invention there is provided a vibration generator composite unit comprising a vibration generator as defined above together with a second vibration generator located coaxially therewith and wherein the two vibration generators are optionally
25 independently controlled, or interdependently controlled, optionally utilizing a microprocessor to control energization of the coils of each of the two tracks independently or according to an interrelationship dictated by desired characteristics of vibrations created thereby. The two vibration generators are preferably of different diameters with the smaller being received within
30 the larger in substantially coplanar relationship and the two are preferably releasably interconnected such as by clipping them together.

It will be understood that vibrations created utilizing a vibration generator or vibration generator composite unit as defined above are created in a plane that is generally parallel to the plane of the track. In the event that a transverse vibratory component is required, an auxiliary vibration generator having a reciprocally movable weight therein can be configured to locate in the centre of the vibration generator with the axis of movement of the weight being at generally right angles to the plane of the track. The reciprocally movable weight is, as in the case of the vibration generator itself, moved by alternating magnetic fields created by at least two electric coils that are energized alternately.

In accordance with a third aspect of the invention there is provided a vibration generator assembly comprising at least two vibration generators or vibration generator composite units as defined above connected to a common control unit that controls the operation of the various magnetic coils associated with the tracks of the various vibration generators.

Further features of this aspect of the invention provide for the various vibration generators to be controlled so that, when spaced apart on a common surface such as that of a mattress, for example, interference waves are created as the two sets of vibrations in generally the same plane impinge on each other.

It will be understood that the interference between the two sets of vibrations, and in the event that there are more vibration generators associated with the assembly, then all of the sets of vibrations, creates what may be considered to be standing waves and by adjustment of the vibration generators the location and severity of the standing waves can be adjusted.

It will therefore be appreciated that vibration generators according to this invention, and assemblies thereof, can be employed to create numerous different types of vibrations even to the extent of controlling the location of

standing waves that are created by interference between two or more sets of vibrations. The invention therefore provides vibration generators and assemblies thereof that are highly versatile and can be configured to provide numerous different configurations of vibrations.

5

In order that the invention may be more fully understood one embodiment and various variations thereof will now be described with reference to the accompanying drawings.

10 BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:-

Figure 1 is a cross-sectional elevation of one form of housing defining a track therein for a freely movable spherical magnetic element;

15

Figure 2 is a partly broken away plan view thereof illustrating also an outer shell encasing the housing;

20

Figure 3 illustrates, in plan view, one assembly of, in this case four, vibration generators according to the invention; and,

Figure 4 is a schematic elevation illustrating the various parts of one vibration generator composite unit having three components.

25

DETAILED DESCRIPTION WITH REFERENCE TO THE DRAWINGS

30 In the embodiment of the invention illustrated in Figures 1 and 2 a housing (1) is made of two injection moulded plastics parts secured together to define an endless circular track (2) of circular shape in cross-section or, to put it

another way, of toroidal shape. A magnetic element in the form of a spherical ball (3) is accommodated within the track, the diameter of the ball being somewhat less than the diameter of the track. The material from which the ball is made can be selected from a number of different materials and it is not yet clear as to whether or not eddy currents could be any significant factor to be taken into account. If so, the ball could be made from any laminated magnetic material, as in the case of transformers. If not the ball could be simply an iron or steel ball, or even one made of a suitable ferrite, for example.

10

A separately moulded insert (4) forms a layer on the circumferentially outer portion of the surface of the track for engagement by the ball as it rotates within the track, in use. This insert is made of a suitable material that has the effect of damping any sound that may be created by the ball engaging the surface of the track and of generally providing a smooth surface that the ball can engage, in operation. The insert can be anchored in position by means of an integral peripheral bead (5) that is clamped between the two parts of the housing at the time of assembly.

20 It is to be mentioned that, as appropriate, the track can be evacuated when sealing the housing in a closed condition and may also be purged with a suitable gas such as nitrogen or helium. Sealing of the housing in a closed condition can be achieved in any way, and the two parts of the housing could be sealed by means of O-rings encircling the inner and outer edges of the two parts, or they may simply be ultrasonically welded together.

25

A series, in this case four, electromagnetic coils (6) are wound around the outside of the housing and at equally angularly spaced positions, as shown in Figure 2. The coils are individually connected to a control cable (7) so that they can be individually energized as may be required.

30

Finally, the housing and associated coils are encased within an outer shell (8) that can be moulded or cast around it to encase and protect the coils and housing.

5 A control unit, indicated by numeral (9) in the Figure 3, is adapted to supply electrical energy to each of the coils sequentially so that the magnetic field generated by each sequentially attracts the ball within the track thereby causing it to move around the track in continuous manner, so long as the electrical energy is supplied sequentially to the coils. The operation is very
10 much along the lines of a linear induction motor.

Clearly, by providing suitable controls (10) on the control unit the speed at which the coils are energized and de-energized can be controlled rather easily using modern-day electronics that do not need to be further described
15 herein. Suffice it to say that the speed can easily be made adjustable between something of the order of 5 to 20 revolutions per second to much higher speeds, as may be required.

As the ball rotates within the track it will create vibrations that are
20 predominantly in the plane of the track. Nevertheless, in the usual case in which the track is orientated horizontally, the weight of the ball will indeed follow a circular path and cause a vertical component of vibration to be generated by virtue the weight of the ball being exerted on the mattress or the like in a constantly changing position of the circular path.

25

As shown in Figure 3, a vibration generator assembly can comprise a plurality of vibration generators as described above and each of which is indicated generally by numeral (11). There are four such vibration generators illustrated in Figure 3, but the actual number used in each
30 assembly will vary according to requirements and size of, for example, mattress (12) on which the assembly is to be used. Irrespective of the number of vibration generators used, the speed of operation of each can be

adjusted independently of the others and the interaction of the different vibrations set up by each of the vibration generators will form a movement somewhat akin to standing waves, as indicated above. The location of the standing waves on the mattress will vary according to the interrelationship of the speeds of rotation of each of the vibration generators.

In order to further enhance the versatility of vibration generators according to the invention, and as illustrated in Figure 4, a composite vibration generator unit may be provided that includes a vibration generator (11) as described above that receives within it, in coplanar and coaxial manner, a smaller diameter vibration generator (13) that conveniently clips within it. In this case, it will be understood, that in instances in which the two balls are located at radially identical positions and are rotated at the same speed, a maximum vibration effect will be achieved whilst if the two balls are located at diametrically opposite locations, a minimum vibration effect will be achieved. On the other hand, if the two balls are rotated at different speeds a surging of the severity of vibration between a maximum and minimum will result.

Still further, as indicated above, if additional transverse vibration is required, a central auxiliary vibration generator (14) can clip, within a vibration generator, in the case illustrated in Figure 4, the inner vibration generator (13). The auxiliary vibration generator (14) may have a simple magnetic element (15) therein that can be caused by coils (16) to oscillate in reciprocating manner in the direction of the axis of the track of the housing, in other words at right angles to the plane of the vibration generator itself. Utilising such an auxiliary vibration generator enables vibrations to be designed that are suitable for achieving any particular purpose.

It will therefore be understood that numerous variations may be made within the scope of this invention without departing from the scope hereof. In particular, it should be noted, that more than one magnetic element can be located within the same track and that, whilst the speed of the two magnetic

elements will generally be limited to being the same, various effects can be achieved, in particular, as regards the severity of vibration generated at any particular speed. Indeed the presence of two magnetic elements within a single endless track could replace the effect of having a second vibration generator received within a first one as described with reference to Figure 4.

Also, considerable flexibility exists as regards the control circuitry and in a preferred arrangement it may depend on performance in practice of the vibration generator. In particular, it is envisaged that it may be necessary to exercise electronic control over the speed of rotation of the magnetic element and with this end in view it may be necessary or desirable to monitor the rotation of the magnetic element within the track of the housing. This may most easily be achieved utilising pick-up coils indicated by numeral (17) in Figures 1 and 2 that would sense passage of the magnetic element past them and feed back a signal to the control circuitry. The feedback could be employed by the circuitry to, for example, increase or decrease power in order to maintain a predetermined speed that may be dependent on the load applied to the vibration generator by virtue of its physical restraint, or otherwise. Still further, the control circuitry may include a control switch device located at the operation generator unit itself for energising the driving coils sequentially based on a single control signal received from the control circuitry. Such an arrangement would diminish the number of conductors required in a control cable such as that indicated by numeral (7) in Figure 2.

Dated this 2nd day of February 2004



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for the applicant

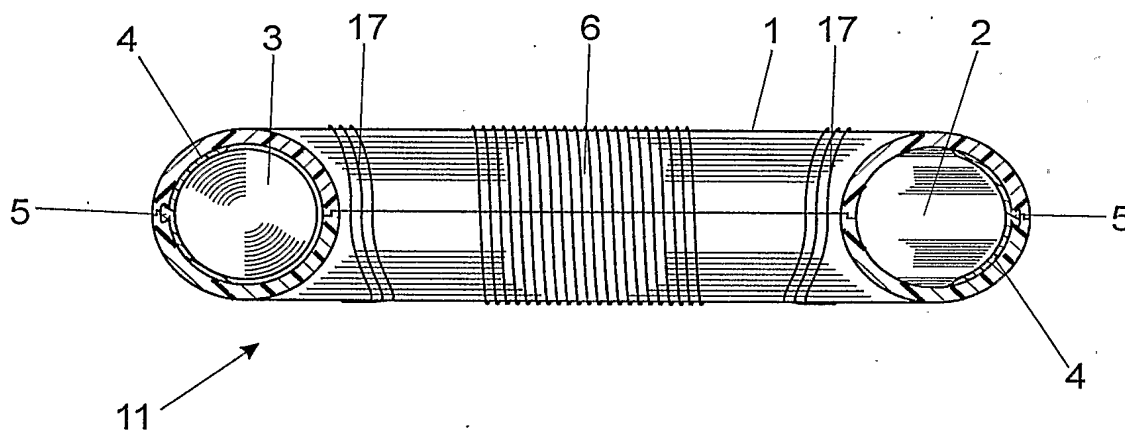


Figure 1

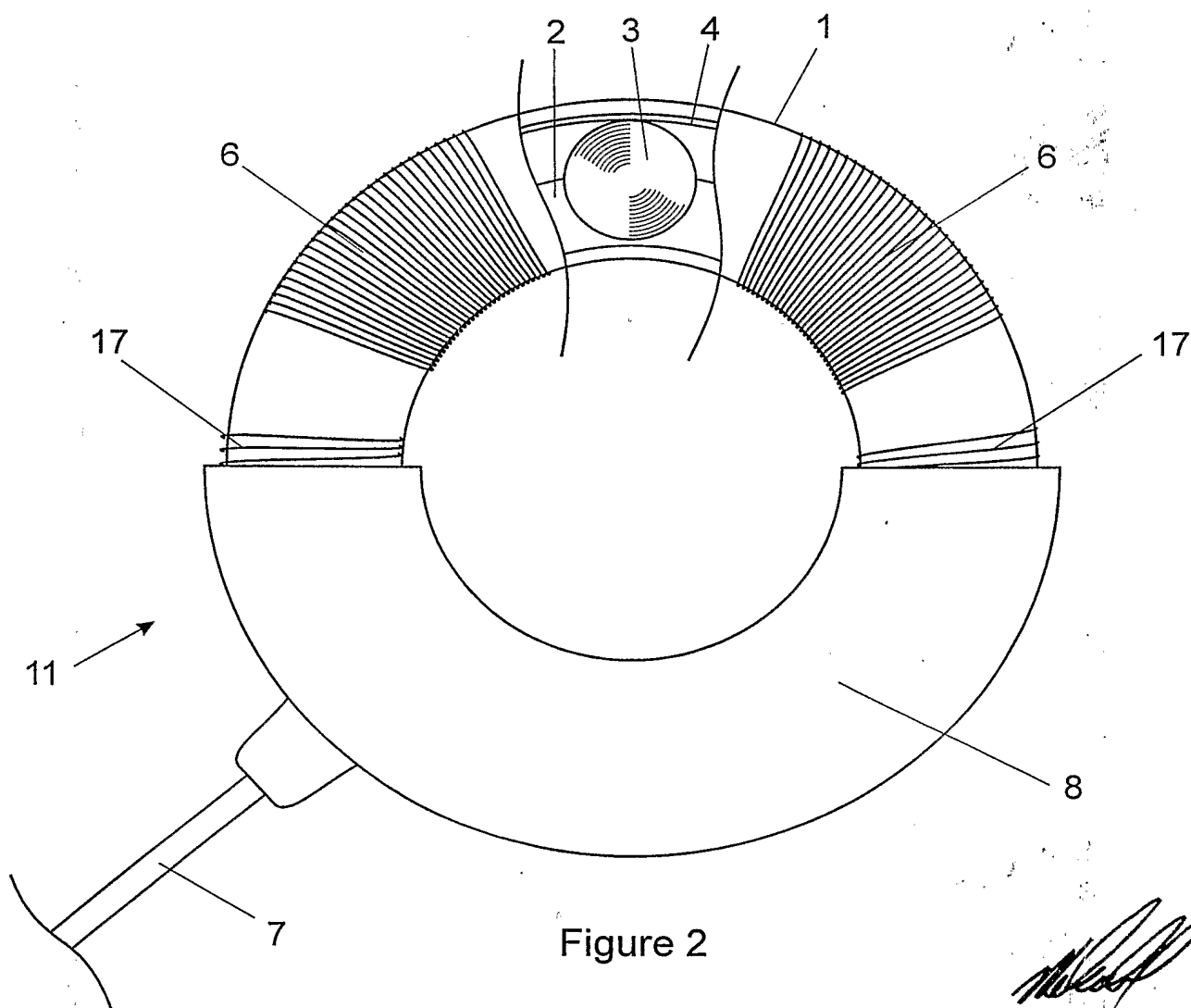


Figure 2

[Signature]

for the applicant

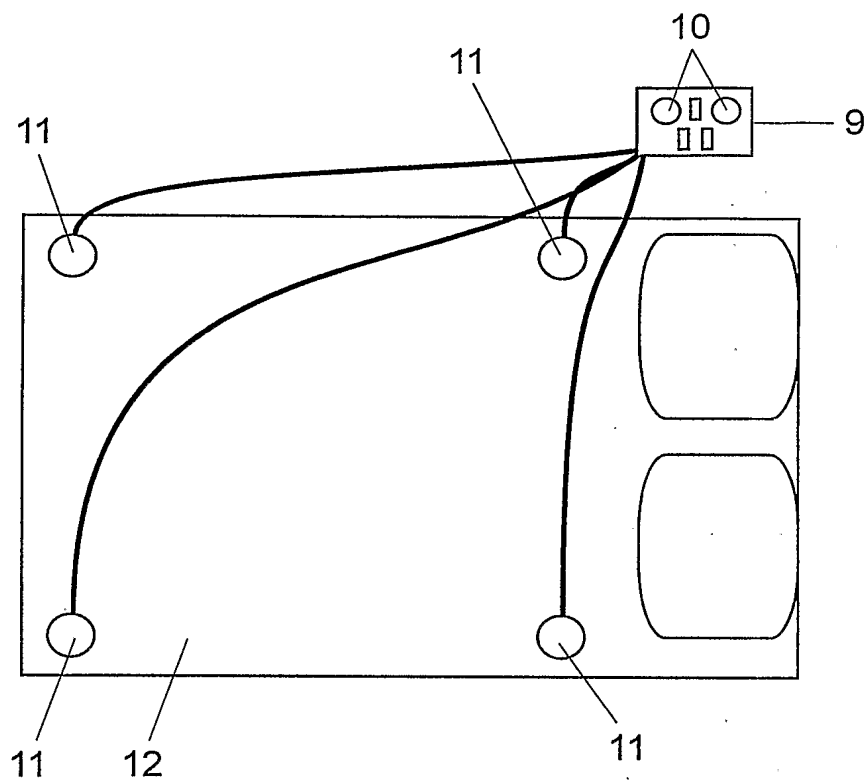


Figure 3

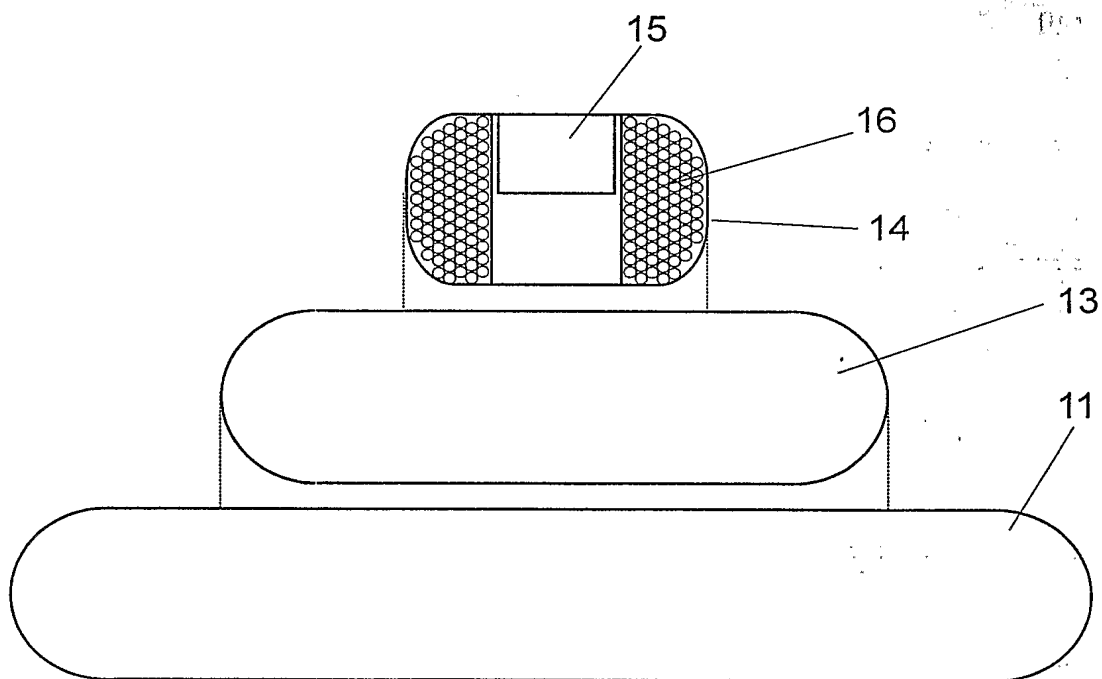


Figure 4

[Signature]
for the applicant

REPUBLIC OF SOUTH AFRICA
PATENTS ACT, 1978
DECLARATION & POWER OF ATTORNEY
Section 30 — Regulations 8,22(l) (c) & 33

21	01	Official Application No 2004/0901	22	Lodging Date 2004-02-04	47	Reference P0312
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71	Full name(s) of applicant(s) OLIVIER, Louis
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71	Full name(s) of inventor(s) OLIVIER, Louis
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Earliest priority claimed	33	Country	31	Number	32	Date
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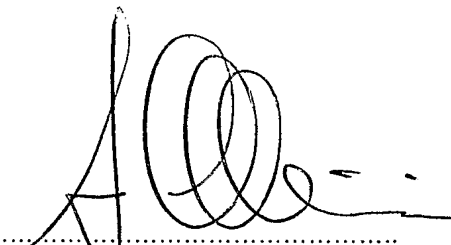
54	Title of invention VIBRATION GENERATOR AND ASSEMBLIES EMBODYING SAME
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I/We **OLIVIER, Louis**

hereby declare that :-

1. I/We am/are the applicant(s) mentioned above;
2. ~~I/We have been authorised by the applicant(s) to make this declaration and have knowledge of the facts herein stated in the capacity of _____ of the applicant(s);~~
3. ~~the inventor(s) of the above mentioned invention is/are the person(s) named above and the applicant(s) has/have acquired the right to apply by virtue of an assignment from the inventor(s);~~
4. to the best of my/our knowledge and belief, if a patent is granted on the application, there will be no lawful ground for the revocation of the patent;
5. ~~this is a convention application and the earliest application from which priority is claimed as set out above is the first application in a convention country in respect of the invention claimed in any of the claims; and~~
6. Michael von Seidel is hereby authorised with powers of substitution and revocation to represent the applicant(s) in this application as from the date of lodging thereof and to be the address for service of the applicant(s) while the application is pending and after a patent has been granted the application.

Signed at Somerset West this 31st day of January 2004



 SIGNATURE(S)
 (No legalization necessary)

Full names

OLIVIER, Louis

Capacity Inventor/Applicant